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10/591,456	09/01/2006	Hiroshi Ogura	071971-0730	2324

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EXAMINER	
ELBIN, JESSE A	

ART UNIT	PAPER NUMBER
2614	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/591,456	OGURA ET AL.	
	Examiner	Art Unit	
	JESSE A. ELBIN	2614	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 May 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-8 and 10-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-8 and 10-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 September 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *7/10/2009*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The amendment filed concurrently with a Request for Continued Examination on May 29, 2009 has been entered.

Specification

2. The amendment filed May 29, 2009 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: claims 13, 16, and 22 refer to the first electrode "[being] included in a fixed film" wherein the specification, as originally filed, does not describe how the "fixed electrode" is to be "included in a fixed film". For the purposes of the art rejections below, the phrase "wherein…the first electrode…is included in a fixed film" will be interpreted as "wherein… the first electrode…is a fixed electrode".

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Agneus et al. (US Patent (4,142,073) (already of record).

Regarding claim 1, Agneus teaches an electret condenser ("electret microphone"; '073 title), comprising: a first electrode ('073 #3; "metallic base plate 3"), a second electrode ('073 #4; "metallic layer 4"); a first insulating film ('073 #2; "second plastic film 2) which is formed between the first electrode (#3) and the second electrode (#4) and is electretized ("the other plastic film 2 is polarized so as to contain electret charges"; '073 col. 1 lines 60-61), and a second insulating film ('073 #1; "first plastic film 1") formed so as to cover upper, lower and side surfaces of the first insulating film (*see Figure wherein the* "second insulating film" *covers the entirety of the* "first insulating film" *such that the* "upper, lower and side surfaces" *are all inherently covered*), wherein the first insulating film (#2) covered with the second insulating film (#1) is formed on the second electrode (#4), the second electrode (#4), the first insulating film (#2), and the second insulating film (#1) compose a vibrating film ("a movable electrode"; '073 col. 1 line 55), and the second insulating film (#1) is formed to be in contact with at least one of the upper (see Figure), side and lower surfaces of the first insulating film.

Regarding claim 5, Agneus remains as applied above.

Agneus further teaches a shape in plan of the first insulating film (#2) being smaller than a shape in plan of the vibrating film (*see Figure*), and the first insulating film

(#2) being arranged at a central part of the vibrating film ("plastic film 2…is concentrically fixed to this by the metalized plastic film 1"; '073 col. 2 lines 30-32).

Regarding claim 17, Agneus teaches an electret condenser ("electret microphone"; '073 title), comprising: a first electrode ('073 #3; "metallic base plate 3"), a second electrode ('073 #4; "metallic layer 4"); a first insulating film ('073 #2; "second plastic film 2) which is formed between the first electrode (#3) and the second electrode (#4) and is electretized ("the other plastic film 2 is polarized so as to contain electret charges"; '073 col. 1 lines 60-61), and a second insulating film ('073 #1; "first plastic film 1") formed so as to be in contact with at least one of upper (see Figure), side and lower surfaces of the first insulating film.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1, 6, 11, 13-20, and 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Loeppert (US Patent 5,490,220 ('220)) (already of record) in view of Johannsen (US PGPub 2002/0181725 ('725)) (already of record).

Regarding claim 1, Loeppert teaches an electret condenser (solid state condenser; '220 title), comprising: a first electrode ("a backplate that constitutes a fixed electrode"; '220 Fig. 7 #64 and abstract); a second electrode ("The diaphragm…constitutes a moveable electrode"; '220 Fig. 7 #44 col. 2 lines 40-42); a first insulating film ("silicon nitride layer"; '220 Fig. 7 #24 and col. 3 line 50) which is formed between the first electrode ('220 Fig. 7 #64) and the second electrode ('220 Fig. 7 #44).

While Loeppert does not explicitly teach the first insulating film being electretized, Loeppert does teach typical condenser microphones requiring a voltage bias element; which is commonly an electret, for the benefit of creating a permanent voltage bias.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the first insulating film taught by Loeppert to be electretized for the benefit of creating a permanent voltage bias in the microphone.

Loeppert does not explicitly teach a second insulating film formed so as to cover upper, lower and side surfaces of the first insulating film, wherein the first insulating film covered with the second insulating film is formed on the second electrode, the second electrode, the first insulating film, and the second insulating film compose a vibrating film, and the second insulating film is formed to be in contact with at least one of the upper, side and lower surfaces of the first insulating film.

In the same field of endeavor, Johannsen teaches a second insulating film (Fig. 3 *dotted line*) formed so as to cover upper, lower and side surfaces of the first insulating film (e.g. Fig. 3 #5), wherein the first insulating film covered with the second insulating film is formed on the second electrode (Fig. 3 *illustrates both electrodes being covered by the* "second insulating film"), the second electrode, the first insulating film, and the second insulating film compose a vibrating film (e.g. diaphragm; Fig. 3 #4), and the second insulating film is formed to be in contact with at least one of the upper, side and lower surfaces of the first insulating film (Fig. 3 *illustrates the hydrophobic coating covering all surfaces of both electrodes and all* "insulating films") for the benefit of reducing stiction ('725 [0002]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the MEMS condenser microphone taught by Loeppert with the hydrophobic coating taught by Johannsen for the benefit of reducing stiction ('725 [0002]).

Regarding claim 6, Loeppert teaches an electret condenser (solid state condenser; '220 title), comprising: a first electrode ("a backplate that constitutes a fixed electrode"; '220 Fig. 7 #64 and abstract); a second electrode ("The diaphragm…constitutes a moveable electrode"; '220 Fig. 7 #44 col. 2 lines 40-42); a first insulating film ("silicon nitride layer"; '220 Fig. 7 #24 and col. 3 line 50) which is formed between the first electrode ('220 Fig. 7 #64) and the second electrode ('220 Fig. 7 #44).

While Loeppert does not explicitly teach the first insulating film being electretized, Loeppert does teach typical condenser microphones requiring a voltage bias element; which is commonly an electret, for the benefit of creating a permanent voltage bias.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the first insulating film taught by Loeppert to be electretized for the benefit of creating a permanent voltage bias in the microphone.

Loeppert does not explicitly teach a lower surface of the first insulating film being covered with the second electrode and upper and side surfaces of the first insulating film are covered with a second insulating film, the second electrode, the first insulating film, and the second insulating film compose a vibrating film, and the second insulating film is formed to be in contact with at least one of the upper, side and lower surfaces of the first insulating film.

In the same field of endeavor, Johannsen teaches a lower surface of the first insulating film (e.g. Fig. 3 #5) being covered with the second electrode (e.g. Fig. 3 #4) and upper and side surfaces of the first insulating film are covered with a second

insulating film (Fig. 3 *dotted line*), the second electrode (#4), the first insulating film (#5), and the second insulating film (*dotted line*) compose a vibrating film (e.g. diaphragm; Fig. 3 #4), and the second insulating film is formed to be in contact with at least one of the upper, side and lower surfaces of the first insulating film (Fig. 3 *illustrates the hydrophobic coating covering all surfaces of both electrodes and all* "insulating films") for the benefit of reducing stiction ('725 [0002]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the MEMS condenser microphone taught by Loeppert with the hydrophobic coating taught by Johannsen for the benefit of reducing stiction ('725 [0002]).

Regarding claim 11, the combination of Loeppert and Johannsen remains as applied above.

Johannsen further teaches the second insulating film (*dotted line*) being formed to be in contact with the upper and side surfaces of the first insulating film (#5, *see* Fig. 3).

Regarding claim 13, the combination of Loeppert and Johannsen remains as applied above.

Johannsen further teaches the first electrode (e.g. Fig. 3 #3) is a fixed electrode ("back-plate").

Regarding claim 14, see the rejection of claim 11 above.

Regarding claim 15, the combination of Loeppert and Johannsen remains as applied above.

Johannsen further teaches the second insulating film (*dotted line*) being formed to be in contact with the upper and side surfaces of the first insulating film (#5, *see* Fig. 3), and the second electrode (Fig. 3 #4) being formed to be in contact with the lower surface of the first insulating film (#5; Fig. 3).

Regarding claim 16, see the rejection of claim 13 above.

Regarding claim 17, Loeppert teaches an electret condenser (solid state condenser; '220 title), comprising: a first electrode ("a backplate that constitutes a fixed electrode"; '220 Fig. 7 #64 and abstract); a second electrode ("The diaphragm…constitutes a moveable electrode"; '220 Fig. 7 #44 col. 2 lines 40-42); a first insulating film ("silicon nitride layer"; '220 Fig. 7 #24 and col. 3 line 50) which is formed between the first electrode ('220 Fig. 7 #64) and the second electrode ('220 Fig. 7 #44).

While Loeppert does not explicitly teach the first insulating film being electretized, Loeppert does teach typical condenser microphones requiring a voltage bias element; which is commonly an electret, for the benefit of creating a permanent voltage bias.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the first insulating film taught by Loeppert to be electretized for the benefit of creating a permanent voltage bias in the microphone.

Loeppert does not explicitly teach a second insulating film formed so as to be in contact with at least one of the upper, side and lower surfaces of the first insulating film.

In the same field of endeavor, Johannsen teaches a second insulating film (Fig. 3 *dotted line*) formed so as to be in contact with at least one of the upper, side and lower surfaces of the first insulating film (Fig. 3 *illustrates the hydrophobic coating covering all surfaces of both electrodes and all* "insulating films") for the benefit of reducing stiction ('725 [0002]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the MEMS condenser microphone taught by Loeppert with the hydrophobic coating taught by Johannsen for the benefit of reducing stiction ('725 [0002]).

Regarding claim 18, the combination of Loeppert and Johannsen remains as applied above.

Loeppert further teaches the first insulating film (#24) being formed on the second electrode (#44).

Regarding claim 19, the combination of Loeppert and Johannsen remains as applied above.

Loeppert further teaches at least one of the first electrode and the second electrode (#44) being included in a vibrating film (Fig. 7 *supra*).

Regarding claim 20, the combination of Loeppert and Johannsen remains as applied above.

Johannsen further teaches the second insulating film (*dotted line*) being formed to be in contact with the upper and side surfaces of the first insulating film (e.g. Fig. 3 #5).

Regarding claim 22, the combination of Loeppert and Johannsen remains as applied above.

Johannsen further teaches at least one of the first electrode (e.g. Fig. 3 #3) and the second electrode being a fixed electrode ("back-plate").

Regarding claim 23, the combination of Loeppert and Johannsen remains as applied above.

Johannsen further suggests use of silicon dioxide ("chemical binding of the hydrophobic layer to…silicon oxide"; '725 [0025] lines 2-3).

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Regarding claim 24, the combination of Loeppert and Johannsen remains as applied above.

Johannsen further teaches the insulating films being a silicon nitride film ("At least the inner surfaces of the diaphragm and the back-plate may be made from a hydrophilic material…e.g.,…Si_xN_y (such as Si3N4)"; [0019] lines 1-2, 9-11).

8. Claims 2 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Loeppert (US Patent 5,490,220 ('220)) (already of record) in view of Johannsen (US PGPub 2002/0181725 ('725)) (already of record) as applied to claim 1 above, and further in view of Majamaa (Effect of Oxidation Temperature on the Electrical Characteristics of Ultrathin Silicon Dioxide Layers Plasma Oxidized in Ultrahigh Vacuum) (henceforth referred to as *Majamaa*).

Regarding claim 2, the combination of Loeppert and Johannsen remains as applied above.

Johannsen further suggests use of silicon oxide ("chemical binding of the hydrophobic layer to…silicon oxide"; '725 [0025] lines 2-3).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a silicon dioxide film as taught by Johannsen as the first insulating film taught by the combination of Loeppert and Johannsen for the benefit of using common semiconductor manufacturing processes to create the microphone

Neither Loeppert nor Johannsen explicitly teach the film being grown in an atmosphere at a temperature in a range between 500 °C and 800 °C, both inclusive.

In the same field of endeavor, Majamaa teaches growth of silicon dioxide layers in a temperature range from "room temperature to 800 °C" (*Majamaa* abstract) for the benefit of growing a specific oxidation layer thickness.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the temperature range taught by Majamaa in the growth of a silicon oxide layer as taught by the combination of Loeppert and Johannsen for the benefit of growing a specific oxidation layer thickness.

Regarding claim 7, see rejection of claim 2 above.

9. Claims 3 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Loeppert (US Patent 5,490,220 ('220)) (already of record) in view of Johannsen (US PGPub 2002/0181725 ('725)) (already of record) as applied to claim 1 above, and further in view of Ross (Effects of Silicon Nitride Growth Temperature on Charge Storage in the MNOS Structure) (henceforth referred to as *Ross*).

Regarding claim 3, the combination of Loeppert and Johannsen remains as applied above.

Johannsen further teaches the insulating films being a silicon nitride film ("At least the inner surfaces of the diaphragm and the back-plate may be made from a hydrophilic material…e.g.,…Si_xN_y (such as Si3N4)"; [0019] lines 1-2, 9-11).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a silicon nitride film as taught by Johannsen as the second insulating film taught by the combination of Loeppert and Johannsen for the benefit of using common semiconductor manufacturing processes to create the microphone

Neither Loeppert nor Johannsen explicitly teach the film being grown in an atmosphere at a temperature in a range between 600 °C and 800 °C, both inclusive.

In the same field of endeavor, Ross teaches growth of silicon nitride in the temperature range of 650 °C to 1100 °C for the benefit of varying the charge stored in the nitride layer.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the temperature range taught by Ross to grow a silicon nitride layer as taught by the combination of Loeppert and Johannsen for the benefit of varying the charge stored in the nitride layer.

Regarding claim 8, see rejection of claim 3 above.

10. Claims 10, 12, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Loeppert (US Patent 5,490,220 (‘220)) (already of record) in view of Johannsen (US PGPub 2002/0181725 (‘725)) (already of record) as applied to claims 1 and 6 above, and further in view of Takeuchi (US Patent 7,039,202 (‘202)) (already of record).

Regarding claim 10, the combination of Loeppert and Johannsen remains as applied above.

Neither Loeppert nor Johannsen explicitly teach that a shape in plan of the first insulating film is smaller than a shape in plan of the vibrating film, and the first insulating film is arranged at a central part of the vibrating film.

In the same field of endeavor, Takeuchi teaches a shape in plan of [a] first insulating film (e.g. Fig. 4 'IL2') is smaller than a shape in plan of the vibrating film (e.g. Fig. 4 'EL'), and the first insulating film is arranged at a central part of the vibrating film (Fig. 4).

Regarding claim 12, the combination of Loeppert and Johannsen remains as applied above.

Neither Loeppert nor Johannsen explicitly teach the second insulating film being formed to be in contact with the upper, side and lower surfaces of the first insulating film.

In the same field of endeavor, Takeuchi teaches [a] second insulating film (e.g. Fig. 4 'PF', 'IF2') being formed to be in contact with the upper ('PF'), side ('PF') and lower ('IF2') surfaces of the first insulating film (Fig. 4 'IL2') for the benefit of "protecting" the electret film.

It would have been obvious to one of ordinary skill in the art at the time of the invention to try the specific structure of electret, including "protecting film" taught by

Takeuchi in the electret taught by the combination of Loeppert and Johannsen for the benefit of "protecting" the electret film.

Regarding claim 21, the combination of Loeppert and Johannsen remains as applied above.

Neither Loeppert nor Johannsen explicitly teach the second insulating film being formed to be in contact with the upper, side and lower surfaces of the first insulating film.

In the same field of endeavor, Takeuchi teaches [a] second insulating film (e.g. Fig. 4 'PF', 'IF2') being formed to be in contact with the upper ('PF'), side ('PF') and lower ('IF2') surfaces of the first insulating film (Fig. 4 'IL2') for the benefit of "protecting" the electret film.

It would have been obvious to one of ordinary skill in the art at the time of the invention to try the specific structure of electret, including "protecting film" taught by Takeuchi in the electret taught by the combination of Loeppert and Johannsen for the benefit of "protecting" the electret film.

Response to Arguments

11. Applicant's arguments filed May 29, 2009 have been fully considered but they are not persuasive. Applicant argues that "when a first film 'covers' a surface of a second film the first film must be disposed ***on*** or ***over*** the surface of the second film (p. 8, original emphasis). Examiner respectfully disagrees that the applicant supplied

definition of the verb “cover” requires the “first film” physically contact all surfaces of the “second film” as is implied by Applicant’s argument. Specifically, definitions 1 and 2 of “cover” state that the covering object be over “the upper surface of something”.

12. Applicant's arguments with respect to claims 1 and 6 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JESSE A. ELBIN whose telephone number is (571)270-3710. The examiner can normally be reached on Monday through Friday, 9:00am to 6:00pm EDT.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Curtis Kuntz can be reached on (571) 272-7499. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. A. E./
Examiner, Art Unit 2614
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